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10/020,543	11/30/2001	Xiang-Dong Mi	83664AEK	9166

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Paul A. Leipold
Patent Legal Staff
Eastman Kodak Company
343 State Street
Rochester, NY 14650-2201

EXAMINER	
QI, ZHI QIANG	
ART UNIT	**PAPER NUMBER**
2871	

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/020,543	MI ET AL.	
	Examiner	Art Unit	
	Mike Qi	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art (AAPA) in view of US 6,034,756 (Yuan et al) and US 5,638,200 (Xu).

Claim 1, AAPA discloses (page 1, line 11 – page 4, line 10; Fig.4A) a vertical–aligned liquid crystal display (an imaging component) comprising:

- a vertically aligned nematic liquid crystal cell (14);
- a polarizer (18 or 12);
- a compensation film (27) containing a positive birefringent material oriented with its optic axis.

AAPA does not expressly disclose the compensation film oriented with its optic axis in a plane perpendicular to the liquid crystal cell surface.

However, Yuan discloses (col. 3, lines 26 – 45; Fig.5) that the compensating layer (180) having optic axis in the substrate (182) and it is normal to plane of the LC cell substrate (perpendicular to the liquid crystal cell surface), and such compensating layer with this tilt can improve the performance of the viewing angle of a TN LCD.

Although Yuan uses the compensating later (180) having discotic compound (normally the discotic structure having negative biregringence), but using positive birefringent material for the compensation that also is common and known in the art.

As an evidence, Xu discloses (col.6, lines 24-53; Figs.5-7) that using retarders (7, 17) in which the optical axes are substantially paralled to the normal direction (perpendicular to the cell surface) and made of positively birefringent material so as to compensate the viewing angle display characteristics such that improving the gray level viewing characteristics.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a compensation film as claimed in claim 1 for improving the viewing angle of the display.

Claim 2, AAPA discloses (Fig.4A) that a pair of polarizers (18, 12) disposed on opposite side of the vertical aligned liquid crystal cell (14), the polarizers (18,12) having polarization axes orthogonally crossed with respect to each other in a direction normal to the cell surface.

Claims 3 and 10, AAPA discloses (Fig.4A) that the compensation film (27 or 30) is disposed between the liquid crystal cell (14) and the polarizer (18 or 12);

Claim 14, AAPA lacking is the limitation such that the optical axis of the compensation film varies. However, Yuan discloses (col.3, lines 26 – 45; Fig.5) that the compensating layer (180) includes substrate (182) (base film), alignment layer (184) and discotic compound layer (186), and the optic axis of the discotic compound layer (186) is changed (even though the discotic compound layer having negative

birefringence, but that shows the optic axis changing), and this change in optic axis is designed to mimic to some degree the tilt of the direction in the LC cell, such that the compensating layer with this tilt can improve the performance of the viewing angle of a TN LCD.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the tilt in the optic axis of the compensation film varies as claimed in claim 14 for improving the performance of the viewing angle of the display.

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Yuan as applied to claims 1-3, 10 and 14 above, and further in view of US 5,747,121 (Okazaki et al).

Claim 4, AAPA and Yuan lacking in the limitation such that the compensation film disposed on a base film. However, Okazaki discloses (col.2, lines 12 – 41) that it is known that the optical compensatory sheet is needed to have negative birefringence for compensating positive birefringence of the twisted nematic liquid crystal and an inclined optic axis. Such that the compensation film is needed to have a positive birefringence for compensating the negative optical anisotropy with an axis along the normal of the substrate, and that would have been at least obvious variation. Okazaki also discloses (col.2, lines 27 – 41) that it also is known the optical compensatory sheet for LCD is prepared on a support film (base film) to support the compensation film.

Since the compensation film must have a base film to support the compensation film and the positive birefringent material must compensate the negative optical anisotropy material, so that to enlarge the viewing angle of the display.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange a compensation film as claimed in claim 4 for enlarging the viewing angle of the display.

4. Claims 5-6, 8-9 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Yuan as applied to claims 1-3, 10 and 14 above, and further in view of US 6,115,095 (Suzuki et al).

Claims 5-6, AAPA and Yaun lacking is the limitation such that two positive birefringent layer having different thickness. However, Suzuki discloses (col.12, line 21 – col.13, line 20; Fig.11) that using first compensation layer (25) having positive optical anisotropy and second compensation layer (26) having positive optical anisotropy, and the two compensation layer can be positioned adjacent to each other (such as one compensation layer disposed on the other compensation layer), and the compensation layer must have a base film to support the compensation layer. Suzuki also discloses (col.8, lines 27-58) that a product ($\Delta nF2xdF2$) of index anisotropy $\Delta nF2$ and a thickness dF2 of the second compensation layer (26) is equal to a quarter of the product (Δnxd) of index anisotropy Δn and a thickness d of the liquid crystal layer, and a product ($\Delta nF1xdF1$) of index anisotropy $\Delta nF1$ and a thickness dF1 of the first compensation layer (25) is equal to about a half of the product (Δnxd) of index anisotropy Δn and a thickness d of the liquid crystal layer. The same material for the compensation layer

must have the same index anisotropy, such that the thickness dF2 of the second compensation layer must be different (such as thinner) from the thickness dF1 of the first compensation layer. So that Suzuki discloses using two compensation layers having different thickness.

Suzuki indicates (col.7, lines 57-59) that such compensation layers compensate the fluctuation in birefringence of the liquid crystal layer caused by variation of a viewing angle. Suzuki also indicates (col.8, lines 20-26) that using two compensation layers to prevent occurrence of light-loosing in oblique viewing angle. Suzuki also indicates (col.9, lines 35-52) that an increase or decrease of birefringence in a liquid crystal layer is compensated for by birefringence variation in a compensation layer when a viewing angle varies, and ensures enhanced optical compensation effect.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use two compensation film having positive birefringent material and having different thickness as claimed in claims 5-6 for preventing the light-loosing in oblique viewing angle and compensate the birefringence variation and enhancing the optical compensation effect.

Claim 8, AAPA lacking is the limitation such that the optical axis of the compensation film varies. However, Yuan discloses (col.3, lines 26 – 45; Fig.5) that the compensating layer (180) includes substrate (182) (base film), alignment layer (184) and discotic compound layer (186), and the optic axis of the discotic compound layer (186) is changed (even though the discotic compound layer having negative birefringence, but that shows the optic axis changing), and this change in optic axis is

designed to mimic to some degree the tilt of the direction in the LC cell, such that the compensating layer with this tilt can improve the performance of the viewing angle of a TN LCD.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the tilt in the optic axis of the compensation film varies as claimed in claim 8 for improving the performance of the viewing angle of the display.

Claim 9, AAPA disclosed (Fig.4A) that an alignment layer can be used to control the pretilt of the liquid crystal molecules; and the function of the alignment layer is to control the pretilt of the liquid crystal molecules, and that is conventional as the applicant admitted in the response of Remarks (page7) recites that it is well known in the art that the alignment layer is needed to generate a tilt angle.

Claim 11, AAPA discloses (Fig.4A) that a compensation film (27) disposed on each side of the liquid crystal cell (14) between the cell (14) and each of the polarizers (18 or 12).

Claim 12, AAPA discloses (Fig.4A) that two compensation films (27 and 30) disposed between the vertical aligned liquid crystal cell (14) and one of the polarizers (18 or 12).

5. Claims 7 and 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Yuan as applied to claims 1-3, 10 and 14 above, and further in view of US 5,796,456 (Takatori et al).

Claims 7 and 13, AAPA and Yuan lacking is the limitation such that the uniform tilt. However, Takatori discloses (col.6, lines 15-62) that the optical compensation layer

uniformly tilt against the axis normal to the surface of the optical compensation layer, and so that the direction of each of their respective optical axes almost correspond to the direction of the liquid crystal when a voltage is applied to the liquid crystal, and such the optical compensation layer improves the view angle dependency.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the tilt in the optic axis of the compensation film is uniform as claimed in claims 7 and 13 for improving the view angle dependency.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Yuan as applied to claims 1-3, 10 and 14 above, and further in view of US 6,319,963 (Coates et al).

Claim 15, AAPA discloses (Fig.4A) that the compensation film (27 or 30) is disposed between the vertical aligned cell (14) and the polarizer (18 or 12).

AAPA does not expressly disclose the vertical aligned liquid crystal cell is disposed between the polarizer and a reflective plate.

However, Coates discloses (col.3, line 60 – col.4, line 28) that a reflective film prepared on a substrate is suitable for mass production, and using reflective polarizer (such as a reflective plate) in a liquid crystal display exhibits a high luminance and a considerable brightness up to large viewing angles.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange a reflective plate as claimed in claim 15 for achieving high luminance and a considerable brightness up to large viewing angles.

7. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA, Yuan and Coates as applied to claims 1-3, 10, 14 and 15 above, and further in view of US 5,747,121 (Okazaki et al) and US 5,796,456 (Takatori et al).

Claim 16, AAPA and Yuan lacking is the limitation such that the compensation film is disposed on a base film.

However, Okazaki discloses (col.2, lines 27 – 41) that it is known the optical compensatory sheet for LCD is prepared on a support film (base film) to support the compensation film.

Still lacking is the limitation such that uniform tilt.

However, Takatori discloses (col.6, lines 15-62) that the optical compensation layer uniformly tilt against the axis normal to the surface of the optical compensation layer, and so that the direction of each of their respective optical axes almost correspond to the direction of the liquid crystal when a voltage is applied to the liquid crystal, and such the optical compensation layer improves the view angle dependency.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the tilt in the optic axis of the compensation film is uniform as claimed in claim 16 for improving the view angle dependency.

8. Claims 17 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA, Yuan and Coates as applied to claims 1-3, 10, 14 and 15 above, and further in view of US 5,747,121 (Okazaki et al).

Yuan discloses (col.3, lines 26 – 45; Fig.5) that the compensating layer (180) includes substrate (182) (base film), alignment layer (184) and discotic compound layer

(186), and the optic axis of the discotic compound layer (186) is changed (even though the discotic compound layer having negative birefringence, but that shows the optic axis changing), and this change in optic axis is designed to mimic to some degree the tilt of the direction in the LC cell, such that the compensating layer with this tilt can improve the performance of the viewing angle of a TN LCD.

Still lacking is the limitation such that the compensation film is disposed on a bade film.

However, Okazaki discloses (col.2, lines 27 – 41) that it is known the optical compensatory sheet for LCD is prepared on a support film (base film) to support the compensation film.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the tilt in the optic axis of the compensation film varies as claimed in claim 17 for improving the performance of the viewing angle of the display and using a base film for supporting.

Claim 20, concerning the limitation of an electronic imaging device containing the component of claim 1 that is only given weight as intended use, because any display can be used for the electronic imaging device.

Claims 21-24, still lacking is the limitations such that the method of orientation.

However, Okazaki discloses (col.2, lines 27 – 56) that according to the prior art of record the birefringence plate with orienting compound by the application of the magnetic or electric field or use rubbing, and that is conventional to force the molecules aligned in the electric filed direction or the rubbing direction. Using shear to force the

orientation also is common and known in the art and using photo-alignment such as using UV-irradiation also is common and known in the art because the shear force would have stronger alignment and the UV-irradiation would reduce the surface friction and protecting the display panel.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use photo-alignment or rubbing or shear force or electric field as claimed in claims 21-24 for achieving the efficient alignment of the compensating film.

9. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA, Yuan and Coates as applied to claims 1-3, 10, 14 and 15 above, and further in view of US 6,115,095 (Suzuki et al) and US 5,796,456 (Takatori et al).

Claims 18 and 19, still lacking is the limitation such that using two positive birefringent layers.

However, Suzuki discloses (col.12, line 21 – col.13, line 20; Fig.11) that using first compensation layer (25) having positive optical anisotropy and second compensation layer (26) having positive optical anisotropy, and the two compensation layer can be positioned adjacent to each other (such as a second compensation layer disposed on the first compensation layer), and the compensation layer must have a base film to support the compensation layer, and such compensation layer having optical axiz extending in a direction perpendicular to the substrates (in a Z-axis direction). Suzuki also indicates (col.8, lines 20-26) that using two compensation layers to prevent occurrence of light-loosing in oblique viewing angle.

Still lacking is the limitation such that uniform tile.

However, Takatori discloses (col.6, lines 15-62) that the optical compensation layer uniformly tilt against the axis normal to the surface of the optical compensation layer, and so that the direction of each of their respective optical axes almost correspond to the direction of the liquid crystal when a voltage is applied to the liquid crystal, and such the optical compensation layer improves the view angle dependency.

Concerning the limitation such that the tilt varies, Yuan discloses (col.3, lines 26 – 45; Fig.5) that the compensating layer (180) includes substrate (182) (base film), alignment layer (184) and discotic compound layer (186), and the optic axis of the discotic compound layer (186) is changed (even though the discotic compound layer having negative birefringence, but that shows the optic axis changing), and this change in optic axis is designed to mimic to some degree the tilt of the direction in the LC cell, such that the compensating layer with this tilt can improve the performance of the viewing angle of a TN LCD.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the tilt in the optic axis of the compensation film is uniform as claimed in claim 18 or to arrange the tilt in the optic axis of the compensation film varies as claimed in claim 19 for improving the performance of the viewing angle of the display.

Response to Arguments

10. Applicant's arguments filed on Dec.4, 2003 have been fully considered but they are not persuasive.

Applicant's arguments are as follows:

1) The reference Yuan discloses that the compensation layer includes a discotic compound layer, and which is negative birefringent material, not positive birefringent material.

2) the references Suzuki, Takatori, Coates, Okazaki do not anticipate of a display having a vertical aligned nematic liquid crystal cell, a polarizer, and a compensation film containing a positive birefringent material oriented with its optic axis tilted in a plane perpendicular to the liquid crystal cell surface.

Examiner's responses to Applicant's arguments are as follows:

1) The reference Yuan is a secondary reference to combine the AAPA to show the limitation of the compensating layer having optic axis in the substrate, and it is normal to plane of the LC cell substrate (perpendicular to the liquid crystal cell surface), and such compensating layer with this tilt can improve the performance of the viewing angle of a TN LCD. The reference Xu is as an evidence to show using positive birefringent material as the compensation film that is common knowledge in the art, so that the office action can be made final (see MPEP 2144.03 D).

2) The references Suzuki, Takatori, Coates, Okazaki are secondary references to show the lacking limitationa from the primary references respectively. Such as Suzuki shows using two compensation films, Takatori shows uniform tilt, Coates shows using reflective film, Okazaki shows various orientation methods, etc.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299. The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi
March 6, 2004

SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800